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Decapod crustacean fauna from the Pliocene and Pleistocene of Arda, Stirone and Enza Rivers (Piacenza, Parma and Reggio Emilia Provinces, N Italy)

Abstract – The discovery of decapod crustaceans from the Pliocene and Pleistocene of Emilia Romagna Region (N Italy) was until now limited to four reports by Ristori (1886), Vinassa de Regny (1896), Beschin & Santi (1997) and Garassino & Fornaciari (2000). The authors reported the presence of *Lobocarcinus sismondae* (Meyer, 1843), from Lesignano de Bagni (Parma), Vignola sul Panaro (Modena) and San Polo d'Enza (Reggio Emilia) respectively. The recent discovery of decapod crustaceans from Arda, Stirone and Enza Rivers increases the carcinologic knowledge of macrurans, brachyurans, and anomurans of Piacenza, Parma and Reggio Emilia Provinces. The studied specimens are assigned to systematic groups already known in other Italian regions or to genera reported for the first time in Italy. The brachyuran specimens include: *Goneplax rhomboides* (Linnaeus, 1758) (family Goneplacidae MacLeay, 1838) and *Lobocarcinus sismondae* (Meyer, 1843) (family Cancridae Latreille, 1802) discovered in Arda, Stirone and Enza Rivers; *Maja squinado* (Herbst, 1788) (family Majidae Samouelle, 1819), *Ebalia cranchii* Leach, 1817 (family Leucosiidae Samouelle, 1819), *Ilia pliocaenica* Ristori, 1891 (family Leucosiidae Samouelle, 1819), and *Calappa granulata* (Linnaeus, 1758) (family Calappidae H. Milne Edwards, 1837) discovered only in Arda River; *Parthenope* sp. (family Parthenopidae MacLeay, 1838) discovered in Arda and Stirone River; *Carcinus* sp. (family Portunidae Rafinesque, 1815) discovered in Cava Campore close to Salsomaggiore Terme (Parma). Moreover, some incomplete specimens of anomurans were discovered in Arda River and ascribed to *Pagurus* sp. and *Anapagurus* sp. (family Paguridae Latreille, 1802). Finally, one fragmentary macruran specimen discovered in Enza River and ascribed to *Nephropsis* sp. (family Nephropidae Dana, 1852) is particularly important because it documents a wider geographical distribution, including this first occurrence in the northern low latitudes.

Key words: Crustacea, Decapoda, Pliocene, Pleistocene, N Italy.

Riassunto – La fauna a crostacei decapodi Plio-Pleistocenica dei Torrenti Arda, Stirone e Enza (Province di Piacenza, Parma e Reggio Emilia, N Italia).

La scoperta di crostacei decapodi Plio-Pleistocenici in Emilia Romagna si è limitata finora a quattro segnalazioni da parte di Ristori (1886), Vinassa de Regny (1896), Beschin & Santi (1997) e Garassino & Fornaciari (2000). Gli autori riferiscono la presenza di *Lobocarcinus sismondae* (Meyer, 1843), rispettivamente a Lesignano de Bagni (Parma), Vignola sul Panaro (Modena) e San Polo d'Enza (Reggio Emilia). La recente scoperta di crostacei decapodi nei torrenti Arda, Stirone e Enza incrementa le conoscenze carcinologiche dei macruri, brachiuri e anomuri delle province di Piacenza, Parma e Reggio Emilia, attribuendo gli esemplari studiati a gruppi sistematici già conosciuti in altre regioni

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d'Italia o a generi segnalati per la prima volta in Italia. Gli esemplari di brachiuri per lo più completi sono stati così ripartiti: *Goneplax rhomboides* (Linnaeus, 1758) (famiglia Goneplacidae MacLeay, 1838) e *Lobocarcinus sismondae* (Meyer, 1843) (famiglia Cancridae Latreille, 1802) rinvenute nei Torrenti Arda, Stirone e Enza; *Maja squinado* (Herbst, 1788) (famiglia Majidae Samouelle, 1819), *Ebalia cranchii* Leach, 1817 (famiglia Leucosiidae Samouelle, 1819), *Ilia pliocaenica* Ristori, 1891 (famiglia Leucosiidae Samouelle, 1819), e *Calappa granulata* (Linnaeus, 1758) (famiglia Calappidae H. Milne Edwards, 1837) rinvenute solo nel Torrente Arda; *Parthenope* sp. (famiglia Parthenopidae MacLeay, 1838) rinvenuta nei Torrenti Arda e Stirone; *Carcinus* sp. (famiglia Portunidae Rafinesque, 1815) rinvenuta in Cava Campore presso Salsomaggiore Terme (Parma). Inoltre, alcuni esemplari di anomuri rinvenuti nel Torrente Arda sono stati attribuiti a *Pagurus* sp. e *Anapagurus* sp. (family Paguridae Latreille, 1802). Infine, particolarmente importante è la scoperta di un esemplare incompleto di macruro, rinvenuto nel torrente Enza e attribuito a *Nephropsis* sp. (famiglia Nephropidae Dana, 1852) in quanto suggerisce una più ampia distribuzione geografica di questo genere fino alle basse latitudini settentrionali.

Parole chiave: Crustacea, Decapoda, Pliocene, Pleistocene, Italia settentrionale.

Introduction

The studies about brachyuran decapod crustaceans from the Pliocene and Pleistocene levels of Emilia Romagna Region until now have been limited to four reports by Ristori (1886), Vinassa de Regny (1896), Beschin & Santi (1997) and Garassino & Fornaciari (2000). The recent discovery of macrurans, brachyurans, and anomurans in Arda, Stirone, and Enza Rivers (Piacenza, Parma, and Reggio Emilia Provinces) (Fig. 1), by some private collectors, permits expansion of the carcinologic knowledge about these systematic groups. The studied specimens are assigned to genera already known in other Italian regions or to genera reported for the first time in Italy.

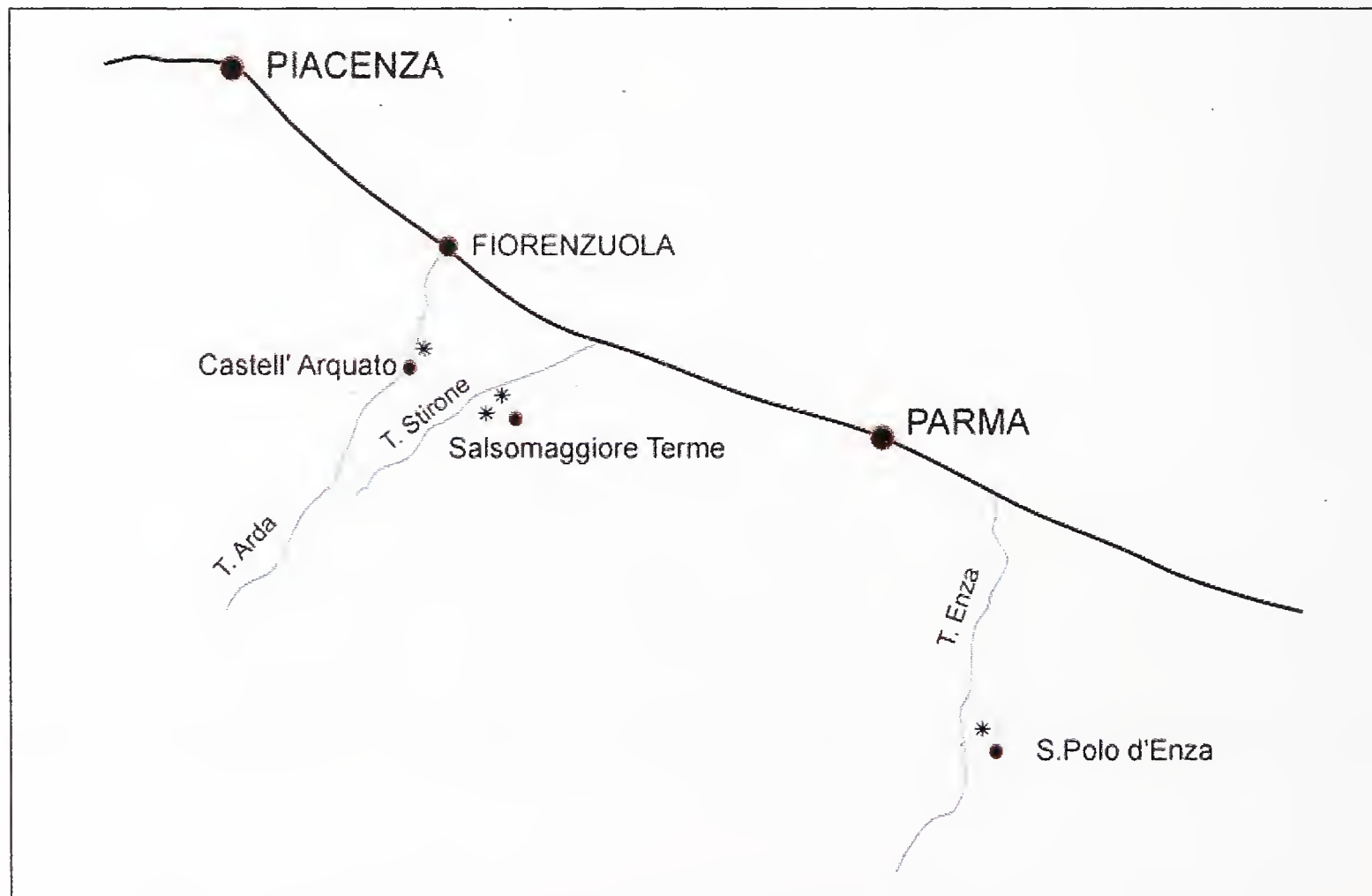


Fig. 1 - Geographic map of the studied area with the fossiliferous sites (asterisk).

Fig. 1 - Cartina geografica dell'area studiata con le località fossilifere (asterisco).

Previous studies of the decapod crustaceans from the Pliocene and Pleistocene of Italy

Piedmont

The first study of decapod crustaceans from Piemonte was conducted by A. Sismonda (1839) who described *Cancer punctulatus* Desmarest, 1822 (today *Lobocarcinus sismondae* (Meyer (1843))), based on two specimens from Santo Stefano Roero (Asti).

E. Sismonda (1846) reported the presence of *Platycarcinus antiquus* Sismonda, 1846, *Xantho edwardsi* Sismonda, 1846, and *Ranina palmea* Sismonda, 1846, from the hills around Asti and Torino. Later, E. Sismonda (1861) reported *Palaeomyra bispinosa* A. Milne Edwards, 1861, *Ranina Aldrovandi* Ranzani, 1820, *Platycarcinus Sismondae* Meyer, 1843, *Portunus Edwardsi* Sismonda, 1861, *Pagurus substriatus* A. Milne Edwards, 1861, and *Callianassa Sismondae* A. Milne Edwards, 1860, from the same localities.

Ristori (1886) reported the presence of *Cancer Sismondae* Meyer, 1843, from the localities of Quagliana around Asti, Santo Stefano Roero, Verruca Savoia and Monte Capriolo close to Bra, and *Titanocarcinus Edwardsii* (E. Sismonda, 1846) from the Pliocene marls of Asti.

Crema (1895) reported *Calappa?* sp. from the Astian (=Piacentian) (upper Pliocene) of Pino d'Asti and *Goneplax Sacci* Crema, 1895, from the Piacentian of Monte Capriolo close to Bra, *Portunus* sp. from the Piacentian of Villavernia, *Goneplax? Craverii* Crema, 1895 (today *Retropluma craverii* (Crema, 1895)), *Titanocarcinus Edwardsii* (E. Sismonda, 1846) (= *Xantho edwardsi* (E. Sismonda, 1846)) and *Cancer Sismondae* Meyer, 1848, from the Piacentian of Bra.

Liguria

Ristori (1886) reported *Cancer Sismondae* Meyer, 1843, *Chlinocephalus demissifrons* Ristori, 1886, and *Coeloma sabatium* Ristori, 1886, from the Pliocene marls of Fornaci close to Savona.

Emilia Romagna

Ristori (1886) reported *Coeloma Isseli* Ristori, 1886, from the Pliocene marls of S. Venanzio (Modena) and *Cancer Sismondae* Meyer, 1843, from Lesignano de Bagni (Parma), dating it to the upper Miocene.

Vinassa de Regny (1896) reported the presence of *Platycarcinus Sismondai* Meyer, 1843, from Lesignano de Bagni (Parma), today housed in the palaeontological collection of the Università degli Studi di Parma.

Beschin & Santi (1997) and Garassino & Fornaciari (2000) reported the presence of *Cancer sismondae* Meyer, 1843, from the Pliocene of Vignola sul Panaro (Modena, N Italy) and from the Pleistocene of Enza River (Parma, N Italy) respectively.

Tuscany

Ristori (1886), carrying on a study of brachyurans and anomurans from the Pliocene of Italy, reported the presence of *Galenopsis?* and *Tribolocephalus laevis* Ristori, 1886, from Orciano (Pisa), *Eriphia Cocchii* Ristori, 1886, and *E. punc-*

tulata Ristori, 1886, from Montrappoli (Val d'Era, Firenze), *Portunus Edwardsi* E. Sismonda, 1861, from Orciano and Val d'Era, *Gonoplax formosa* Ristori, 1886, and *G. Meneghinii* Ristori, 1886, from Rapolano (Siena), *Pagurus substriatus* A. Milne Edwards, 1861 (today *Dardanus arrosor* (Herbst, 1796)) from Volterra (Pisa), and *Pagurus squamosus* Ristori, 1886, from Sarteano (Siena).

Later, Ristori (1891a, 1892), expanding the study of brachyurans from the Pliocene of Italy, reported the presence of *Titanocarcinus sculptus* Ristori, 1891, and *Palaega Sismondai* Ristori, 1891 (today *Bathynomus sismondai* (Ristori, 1891a) from Mucigliani (Siena), *Eriphia punctulata* Ristori, 1886, from Montrappoli, Torrita (Val di Chiana, Firenze) and Poggio all'Olio (Empoli), *Calappa* sp. from Orciano (Pisa), *Portunus Edwardsii* E. Sismonda, 1861, *Ilia plio-caenica* Ristori, 1891, *Ebalia Fucinii* Ristori, 1892, and *Thalassina* sp. from Spicchio (Empoli).

Ristori (1893) reported *Portunus* sp. and *Pilumnus spinosus* Ristori, 1886, from Pianosa Island (Livorno).

Ristori (1896) reported *Titanocarcinus subovalis* Ristori, 1896, from the Pliocene clay of Arbia (Siena) and *Goneplax Meneghinii* Ristori, 1886, from the Pliocene clay of Rapolano (Siena).

Fucini (1910) reported the discovery of one specimen belonging to *Eriphia Cocchii* Ristori, 1886, from the Pliocene of Spicchio (Empoli).

Delle Cave (1988a, 1988b) reported the presence of *Jaxea* cfr. *nocturna* Nardo, 1847, from the Pliocene of Castelfiorentino (Firenze) and *Monodaeus bortolottii* Delle Cave, 1988 (1988b), from the Piacentian of Botro dell'Alpino, close Volterra (Pisa).

Umbria

Ristori (1891a) reported *Ranina propinqua* Ristori, 1891, from the Pliocene sands of Via della Madonna degli Angeli (Città della Pieve, Perugia).

Latium

Desmarest (1822) reported *Goneplax impressa* Desmarest, 1822, from Monte Mario (today *G. rhomboides* Linnaeus, 1758).

Ceselli (1848) reported the presence of *Cancer marianus* Ceselli, 1848, from Monte Mario and later Conti (1864) described *Ebalia Pennantii* Leach, 1815 (today *E. tuberosa* (Pennant, 1777)), and *Psammocarcinus* (*Portunus*) *leucodon* Desmarest, 1822 (today *Scylla serrata* Forskål, 1775), from the same locality.

Ristori (1891a, 1891b) reported *Cancer Simondae* Meyer, 1843, from Anzio Tor Caldara (Roma) and the following species from Monte Mario and Farnesina localities: *Pilumnus spinosus* Ristori, 1886 (today *Cancer spinosus* (Ristori, 1886)), *Pseudocarcinus*? sp., *Gonoplax bispinosa* Leach, 1815 (today *Goneplax rhomboides* (Linnaeus, 1758)), *Lambrus*? sp., *Calappa* sp., *Ebalia Pennantii* Leach, 1815, *E. Cranchii* Leach, var. *romana* Ristori, 1891, *Ilia* cfr. *nucleus* (Herbst, 1794), *Pagurus striatus* Latreille, 1803 (today *Dardanus arrosor* (Herbst, 1796)), *Calcinus* sp., *Gebia* cfr. *stellata* Montagu, 1808 (today *Upogebia stellata* Montagu, 1808). The author described also *Callianassa subterranea* Leach, var. *dentata* Ristori, 1891, discovered in the marine tuff of Torre Astura (Anzio, Roma).

Maxia (1946) reported *Ebalia cranchii* Leach var. *romana* Ristori, 1891, and

Cancer Sismondai Meyer var. *antiatina* Maxia, 1946, from the post-Pliocene sands of Monte Mario and from the Piacentian marly clay of Anzio (Roma).

Puglia

Varola (1965, 1981) reported from the middle Pliocene of Salentina Peninsula (Lecce) the following decapods: *Cancer sismondai* Meyer, 1843, from Otranto and Torre dell'Orso, *Callianassa* sp. from Rocca Vecchia, Torre dell'Orso, S. Andrea, Otranto and Ristola di Leuca, *Callianassa subterranea dentata* Ristori, 1889, and *Maja squinado* (Herbst, 1788) from Rocca Vecchia, *Dromia personata* (Linnaeus, 1758), *Eriphia verrucosa* (Forskål, 1775), *Maja* sp., and *Pilumnus* sp. from Leuca.

Bonfiglio (1982) and Bonfiglio & Donadeo (1982) reported the presence of *Cancer sismondai* Meyer, 1843, in the Pliocene and post-Pliocene sediments of Otranto and Torre dell'Orso.

Calabria

Bortoluzzi (2002) reported the presence of *Lobocarcinus sismondae* (Meyer, 1843) in the Plio-Pleistocene of Strangoli (Catanzaro).

Sicily

The presence of some chelae discovered in the sediments of Monte Pellegrino in Sicily (S Italy) was reported by A. Milne Edwards (1861). These chelae were ascribed to the following species: *Maja squinado* (Herbst, 1788), *Goneplax rhomboides* (Linnaeus, 1758), *Ilia nucleus* (Linnaeus, 1758), *Calappa granulata* (Linnaeus, 1758), and *Xantho floridus* (Montagu, 1813).

Ristori (1886) reported the presence of *Cancer Sismondae* Meyer, 1843, and *Pilumnus spinosus* Ristori, 1886 (today *Cancer spinosus* (Ristori, 1886)) from the Astian of Tremonte, *Hepatinulus Seguentiae* Ristori, 1886, from Scoppo and S. Filippo (Trapani) and *Galathea affinis* Ristori, 1886, from the Astian of Bianchi.

Checchia-Rispoli (1903) described a well-preserved carapace of *Xantho floridus* Montagu, 1813 (today *Xantho incisus* (Leach, 1814)) from the post-Pliocene tufa of Vergine Maria village near Palermo (Sicily).

Checchia-Rispoli (1905) reported the presence of *Atelecyclus rotundatus* (Olivi, 1792) from the post-Pliocene tufa of Ficarazzi village (Palermo).

Gemmellaro (1914) described a rich decapod fauna from the tufa around Palermo with the following species: *Dromia vulgaris* H. Milne Edwards, 1837 (today *D. personata* (Linnaeus, 1759)), *Dorippe lanata* (Linnaeus, 1766), *Ebalia Cranchii* Leach var. *romana* Ristori, 1891, *Ebalia Pennanti* Leach, 1815 (today *E. tuberosa* (Pennant, 1777)), *Calappa granulata* (Linnaeus, 1758), *Maja squinado* (Herbst, 1788), *Maja squinado* (Herbst) var. *Di-stefanoi* Gemmellaro, 1914, *Pisa Gibbsi* Leach, 1815 (today *P. armata* (Latreille, 1803)), *Lambrus* sp. (today *Parthenope* sp.), *Xantho florida* (Montagu, 1813) (today *X. incisus* (Leach, 1814)), *Pilumnus villosus* Risso, 1826, *Eriphia spinifrons* (Herbst, 1782) (today *E. verrucosa* (Forskål, 1775)), *Portunus tuberculatus* Roux, 1828 (today *Macropipus tuberculatus* (Roux, 1828)), *Atelecyclus rotundatus* (Olivi) var. *Checchiae* Gemmellaro, 1914, *Gonoplax* cfr. *rhomboides* (Linnaeus, 1758), *Pachygrapsus marmoratus* (Fabricius, 1787), *Pagurus* sp., *Gebia* cfr. *stellata* Leach, 1815 (today *Upogebia*

cfr. *stellata* Leach, 1815), and *Callianassa subterranea* (Montagu) var. *dentata* Ristori, 1891.

Garassino & De Angeli (2004) reported *Parthenope angulifrons* Latreille, 1825, and *Atelecyclus rotundatus* (Olivi, 1782) from the upper Pleistocene of Favignana Island (Isole Egadi, Trapani).

Sardinia

Meneghini (1857) reported *Platycarcinus antiquus* E. Sismonda, 1846, from Capo S. Marco (Oristano) and *Maja squinado* from Alghero. Later, Comaschi Caria (1956) pointed out that these species, referred by Ristori (1886) to the Miocene, must be considered Pliocene and Pleistocene in age.

Geologic setting of Arda, Stirone and Enza Rivers

Recently, a project conducted by Ceregato *et al.* (project 190, not published) of the Dipartimento di Scienze della Terra e Geologico – Ambientali (DSTGA) of the Università di Bologna, considered the deposits of the Bacino di Castell'Arquato belonging to the Formazione di Castell'Arquato, previously referred to the upper Pliocene (Correggiari *et al.*, 1992). Two stratigraphic sections (Arda-1 and Arda-2) were analyzed. These deposits of marine-marginal and platform environment are mostly fine sediment in which coarser levels and calcarenitic levels are intercalated. The malacologic analysis of section Arda-1 pointed out the presence of 65 taxa of gastropods, 62 taxa of bivalves, 4 taxa of scaphopods and 1 taxon of polychaetes referable to the lower Pliocene and lower-middle Pleistocene.

The Stirone section, located 12 km from Castell'Arquato, was first described by Dondi (1961) and later by Papani & Pelosio (1962) who studied this section, subdivided into five levels with a total thickness of 970 metres. The study of foraminiferal and molluscal faunas suggested a middle-upper Pliocene and Pleistocene age for the series.

The Pleistocene sequence of Enza River crops out down stream from the bridge linking the villages of Traversetolo (Parma) and S. Polo d'Enza (Reggio Emilia). Its age is based on the discovery of some specimens of *Arctica islandica* about 10 metres from the base of the sequence. The Pleistocene sequence, recently studied by Fornaciari (1997), consists of marine sediments followed by terrestrial deposits, comprising of conglomerates and lacustrine marls with a total thickness of 180 metres.

Material

The studied sample consists of 57 complete and fragmentary specimens, coming from the Pliocene and Pleistocene levels of Arda, Stirone, and Enza Rivers. The studied specimens are three-dimensionally preserved and their preparation is easy due to the soft consistency of the surrounding rock. The study of the sample, housed in the palaeontological collection of Museo Geologico di Castell'Arquato (Piacenza), permitted identification of the following species: *Nephropsis* sp. (family Nephropidae Dana, 1852 – 1 specimen), *Pagurus* sp. (family Paguridae

Latreille, 1802 – 3 specimens), *Anapagurus* sp. (family Paguridae Latreille, 1802 – 1 specimen), *Calappa granulata* (Linnaeus, 1758) (family Calappidae H. Milne Edwards, 1837 – 3 specimens), *Ebalia cranchii* Leach, 1817 (family Leucosiidae Samouelle, 1819 – 14 specimens), *Ilia pliocaenica* Ristori, 1891 (family Leucosiidae Samouelle, 1819 – 5 specimens), *Maja squinado* (Herbst, 1788) (family Majidae Samouelle, 1819 – 1 specimen), *Parthenope* sp. (family Parthenopidae MacLeay, 1838 – 4 specimens), *Lobocarcinus sismondae* (Meyer, 1843) (family Cancridae Latreille, 1802 – 8 specimens), *Carcinus* sp. (family Portunidae Rafinesque, 1815 – 4 specimens), and *Goneplax rhomboides* (Linnaeus, 1758) (family Goneplacidae MacLeay, 1838 – 13 specimens),

The systematic palaeontology used in this paper follows the recent classification proposed by Martin & Davis (2001).

Acronym. MG: Museo Geologico di Castell'Arquato (Piacenza, N Italy) (general collection)

Systematic Palaeontology

Order Decapoda Latreille, 1802
 Infraorder Astacidea Latreille, 1802
 Superfamily Nephropoidea Dana, 1852
 Family Nephropidae Dana, 1852
 Genus *Nephropsis* Wood-Mason, 1873

Type-species: *Nephropsis stewarti* Wood-Mason, 1873

Nephropsis sp.

Fig. 2

Occurrence and measurements: we ascribe to this genus one incomplete specimen. MG 0620 (Enza River) of which only the left chela of pereopod I is preserved (left chela: fragment of propodus and complete index and dactylus).

Sizes of left chela - length of index: 50 mm
 length of dactylus: 45 mm

Description. Only the left chela of pereopod I is preserved. Fragment of propodus, cylindrical in shape, with upper margin having strong spiny tubercles. Very elongate index with upper margin having strong spiny tubercles. Inner margin of index with button-shaped teeth of equal shaped size, except for one strong raised tooth at midlength. Pointed distal extremity of index strongly curved downwards. Dactylus shorter than index with pointed distal extremity curved upwards. Inner margin of dactylus with two strong button-shaped teeth in the proximal part and smaller button-shaped teeth in the middle and distal parts. Upper margin of dactylus with strong spiny tubercles.

Discussion. Many authors have expressed different views on the taxa that

should be included within the Astacidea. A compilation of taxa discussed by Albrecht (1983), Schram *et al.* (1978), Forest & de Saint Laurent (1989), Martin & Davis (2001), Feldmann *et al.* (2002), Feldmann & de Saint Laurent (2002), Schweigert *et al.* (2003) and Rode & Babcock (2003) suggests that the infraorder Astacidea Latreille, 1802 includes many living and fossil families (there are some doubts about the assignment of Palaeopalaemonidae and Protoastacidae to Astacidea): Astacidae Latreille, 1803 (Lower Cretaceous – Recent), Cambaridae Hobbs, 1942 (Upper Jurassic – Recent), Chilenophoberidae Tshudy & Babcock, 1997 (Upper Cretaceous), Chimaerastacidae Amati, Feldmann & Zonneveld, in press (Middle Triassic), Cricoidoscelosidae Taylor, Schram & Shen, 1999 (Upper Jurassic), Erymidae Van Straelen, 1924 (Lower Triassic – Upper Cretaceous), Mecochiridae Van Straelen, 1925 (Upper Triassic – Upper Cretaceous), Nephropidae Dana, 1852 (Middle Triassic – Recent), Palaeopalaemonidae Brooks, 1962 (Upper Devonian), Parastacidae Huxley, 1878 (Oligocene – Recent), Platychelidae Glaessner, 1969 (Upper Triassic), Pemphicidae Van Straelen, 1928 (Middle Triassic), Protoastacidae Albrecht, 1983 (Upper Cretaceous), Uncinidae Beurlen, 1928 (Lower Jurassic) and Glypheidae Zittel, 1885 (Upper Triassic – Recent).

Among these families only the representatives of the family Nephropidae exhibit a slender and very elongate propodus of the chelae, like that of the studied specimen. Today, this family may include as many as twelve living and fossil genera, based upon a compilation of taxa mentioned by Jenkins (1972), Hu (1983), Feldmann (1989), Aguirre Urreta *et al.* (1991), Tshudy & Sorhannus (2000): *Jagtia* Tshudy & Sorhannus, 2000 (Upper Cretaceous), *Homarus* Weber, 1795 (Upper Cretaceous – Recent), *Hoploparia* M'Coy, 1849 (Lower Cretaceous – Miocene), *Lissocardia* Meyer, 1847 (Middle Triassic), *Metanephrops* Jenkins, 1972 (Upper Cretaceous – Recent), *Nephrops* Leach, 1814 (Paleocene), *Nephropsis* Wood-Mason, 1872 (Eocene), *Oncopareia* Bosquet, 1854 (Upper Cretaceous), *Palaeohomarus* Mertin, 1941 (Lower-Upper Cretaceous) and *Wongastacia* Hu, 1983 (Upper Cretaceous). Even though the studied specimen is incomplete, the slender and very elongate propodus of pereopod I with the index longer than dactylus and both with pointed distal extremities strongly curved are characters observable only in *Nephropsis*, as showed in some living species (Holthuis, 1991), such as *N. aculeata* S.I. Smith, 1881, *N. agassizii* A. Milne Edwards, 1880, *N. neglecta* Holthuis, 1974, and *N. rosea* Bate, 1888. In fact, the other above mentioned fossil genera do not show these kinds of characters for the presence of a strong heterochely, such as in *Homarus* and *Palaeohomarus*, or inner margins of the index and dactylus with small conical teeth, such as in *Lissocardia*, *Metanephrops*, *Nephrops*, *Hoploparia*, *Palaeonephrops*, and *Oncopareia* (*Wongastacia* is not included in this list because it does not preserve the chelae of pereopod I).

Even though the studied specimen is assigned to *Nephropsis*, we point out that the inner margins of the index and dactylus with strong and small button-shaped teeth is not a character typical of this genus, as for the other living genera.

Nephropsis Wood-Mason, 1873 includes one fossil species, *N. midwayensis* Rathbun, 1835, from the lower Eocene of Alabama (United States) (Rathbun, 1835). Unfortunately, it is very difficult to compare the studied specimen with Rathbun's

species because the latter is very poorly preserved, showing only a left fragmentary chela with a piece of the carpus. Only the discovery of more complete specimens from Enza River will make possible a more detailed morphological description of this probable new species in the future, limited today to a sample report.

Extant *Nephropsis* has a wide latitudinal distribution, ranging from the North Atlantic to the Indo-Pacific regions (Holthuis, 1974), so the ascription of the Italian specimen to this genus suggests a wider distribution for the fossil representatives including the northern low latitudes.

Infraorder Anomura MacLeay, 1838
Superfamily Paguroidea Latreille, 1802
Family Paguridae Latreille, 1802
Genus *Pagurus* Fabricius, 1775

Type-species: *Cancer bernhardus* Linnaeus, 1758

Pagurus sp.
Fig. 3 (4, 5, 6)

Occurrence and measurements: we ascribe to this genus three small-sized dactyli (3-4 mm). MG 0632, MG 0633, MG 0634 (Arda River).

Discussion. Dactyli have the following characters: subtriangular shape, short and convex; curved upper margin with rounded or spiny tubercles; concave lower margin (distal margin) with small teeth joined each other; outer margin with occasional granulations. We note that the specimen MG 0634 should be probably ascribed to another genus because the spines of the upper margin are longer and the outer margin of the dactylus is richly granulate.

Genus *Anapagurus* Henderson, 1888

Type-species: *Pagurus laevis* Bell, 1845

Anapagurus sp.
Fig. 3 (9)

Occurrence and measurements: we ascribe to this genus one small-sized propodus (2 mm). MG 0635 (Arda River).

Discussion. Propodus has the following characters: as long as wide with convex and tuberculate upper and lower margins; tuberculate and swollen outer margin; subtriangular shape with curved lower margin and occlusal margin with some short teeth. *Anapagurus* Henderson, 1888 is widespread in Mediterranean Sea and Atlantic Ocean with nine living species (Falciai & Minervini, 1992). The studied specimen shows some morphological affinities with the living species *A. breviaculeatus* Fenizia, 1937.

Infraorder Brachyura Latreille, 1802
 Superfamily Calappoidea H. Milne Edwards, 1837
 Family Calappidae H. Milne Edwards, 1837
 Genus *Calappa* Weber, 1795

Type-species: *Cancer granulatus* Linnaeus, 1758

Calappa granulata (Linnaeus, 1758)
 Fig. 4 (1, 2, 3)

- 1758 *Cancer granulatus* – Linnaeus, p. 1-824
- 1767 *Cancer granulatus* – Linnaeus, p. 533-1327
- 1798 *Calappa granulata* – Fabricius, p. 346
- 1816 *Calappa granulata* – Risso, p. 18
- 1825 *Calappa granulata* – Desmarest, p. 109, Pl. 10 (Fig. 1)
- 1828 *Calappa granulata* – Roux, Pl. 2 (Fig. 13), Pl. 16 (Figs. 1-7)
- 1863 *Calappa granulata* – Heller, p. 130, Pl. 4 (Fig. 3)
- 1891 *Calappa* sp. – Ristori, p. 9, Pl. 1 (Figs. 10, 15)
- 1914 *Calappa granulata* – Gemmellaro, p. 80, Pl. 1 (Figs. 9-10)
- 1918 *Calappa granulata* – Pesta, p. 308, Text-Fig. 97
- 1936 *Calappa granulata* – Nobre, p. 81, Pl. 28 (Figs. 73-74)
- 1940 *Calappa granulata* – Bouvier, p. 203, Text-Fig. 203, Pl. 7 (Fig. 1)
- 1946 *Calappa granulata* – Zariquiey Alvarez, p. 143, Text-Fig. 163
- 1965 *Calappa granulata* – Forest, p. 362
- 1968 *Calappa granulata* – Zariquiey Alvarez, p. 315, Text-Figs. 105c, 107a
- 1992 *Calappa granulata* – Falciai & Minervini, p. 181, Pl. 12 (Fig. 4)

Occurrence and measurements: we ascribe to this species three fragmentary chelae. MG 0609, MG 0610, MG 0611 (Arda River).

Discussion. We ascribe to this species one propodus and two isolated dactyli with the typical shape of the representatives of the family Calappidae. Propodus is flat and short, as long as wide, without the upper margin and with short teeth. Lower margin with a longitudinal row of small-sized granulations. Some granulations are also present along the outer margin of propodus. Dactyli are curved and longer than the propodus, with granulations along the upper margin and strong prominence on the basis of the outer margin.

The studied specimens, even though incomplete, show some morphological affinities with *Calappa granulata* (Linnaeus, 1758).

Calappa sp. described by Ristori (1891a) on two dactyli from the Pliocene of Orciano (Pisa) and *Calappa granulata* (Linnaeus, 1758) described by Gemmellaro (1914) on two dactyli from the Pliocene of Altavilla (Palermo) and from the Pleistocene of Monte Pellegrino (Palermo) have the same morphological characters of the studied specimens.

Superfamily Leucosioidea Samouelle, 1819

Family Leucosiidae Samouelle, 1819

Genus *Ebalia* Leach, 1817

Type-species: *Cancer tuberosus* Pennant, 1777

Ebalia cranchii Leach, 1817

Figs. 3 (7, 8), 4 (4), 5, 6

1817 *Ebalia Cranchii* – Leach, Pl. 25 (Figs. 7-11)

1846 *Ebalia Cranchii* – Bell, p. 148

1855 *Ebalia Cranchii* – Bell, p. 303

1891 *Ebalia Cranchii* var. *romana* – Ristori, p. 22, Pl. 1 (Figs. 21-23)

1914 *Ebalia Cranchii* var. *romana* – Gemmellaro, p. 78, Pl. 1 (Figs. 3-6)

1936 *Ebalia Cranchii* – Nobre, p. 78, Pl. 26 (Fig. 64)

1940 *Ebalia Cranchii* – Bouvier, p. 209, Pl. 7 (Figs. 7-10)

1946 *Ebalia cranchii* var. *romana* – Maxia, p. 132, Pl. 1 (Fig. 1)

1956 *Ebalia cranchii* – Monod, p. 122, Text-Figs. 145-146

1965 *Ebalia cranchii* – Forest, p. 364-371, Text-Fig. 25 a-b, Pl. 2 (Figs. 1-2)

1968 *Ebalia cranchii* – Zariquiey Alvarez, p. 329, Text-Figs. 108 a-b, 111 (b), 111A (a), 111C (b)

1992 *Ebalia cranchii* – Falciai & Minervini, p. 184

Occurrence and measurements: we ascribe to this species ten well-preserved specimens in dorsal view: MG 0604, MG 0605, MG 0606, MG 0607, MG 0622, MG 0623, MG 0624, MG 0625, MG 0626, MG 0627, MG 0648 (Arda River); four complete chelae: MG 0608, MG 0628, MG 0629, MG 0630 (Arda River). Carapace length comprised between 3 and 9 mm.

Discussion. Ristori (1891b) described some carapaces of leucosiid crabs from the lower Pliocene of Monte Mario (Roma). Even though, these specimens showed some morphological affinities with the living species *Ebalia cranchii* Leach, 1817, the author distinguished them with the name “*romana*” for the carapace longer than that of the living species and, above all in the male individuals, the cardiac protuberance was more developed and sharp, and the protuberance of the posterior margin was sharper in the female individuals. Later, *Ebalia cranchii* var. *romana* Ristori, 1891, was reported from the Sicilian of Ficarazzi and Monte Pellegrino (Palermo) and from the lower Pleistocene of Monte Mario (Gemmellaro, 1914; Maxia, 1946).

The studied specimens show all the morphological characters of Ristori’s species, above all the small-size of the carapace and the location of the dorsal protuberances.

However, the morphological differences pointed out by Ristori are not true after a comparison with the living species. In fact, the shape of the carapace is the same as that reported in the picture by Zariquiey Alvarez (1968, Text-Fig. 111C-b), even though there is a larger expansion of the front respect to the orbits in the studied specimens.

Moreover, we ascribe to the same species some isolated chelae from Arda River and discovered in association with the carapaces. The shape of these chelae resembles that of some fixed fingers illustrated by Ristori (1891b, Text-Figs. 24-25) and ascribed to *Ebalia pennantii* Leach, 1815, today a synonym of *E. tuberosa* (Pennant, 1777).

Ebalia cranchii Leach, 1817 is widespread in Atlantic Ocean, Great Britain, Norway and Mediterranean Sea. Besides *E. cranchii* Leach, 1817, other leucosiid crabs are present in Italian Pliocene and Pleistocene levels: *E. tuberosa* (Pennant, 1777) (= *E. pennantii* Leach, 1815), *E. fucinii* Ristori, 1892, *Ilia pliocaenica* Ristori, 1891, and *Hepatinulus seguentiae* Ristori, 1886 (Ristori, 1886, 1891a, 1891b, 1892; Gemmellaro, 1914).

Genus *Ilia* Leach, 1817

Type-species: *Cancer nucleus* Linnaeus, 1758

Ilia pliocaenica Ristori, 1891
Fig. 4 (5)

1891 *Ilia pliocaenica* – Ristori, p. 10, Pl. 1 (Figs. 8, 9, 11, 12, 14)

Occurrence and measurements: we ascribe to this species five merus of the pereopod I. MG 0636, MG 0637, MG 0638, MG 0639, MG 0647 (Arda River).

Discussion. The merus of the pereopod I is elongate and with rich granulations. The studied specimens are comparable to the merus illustrated by Ristori (1891a, Pl. 1 – Fig. 14) for *Ilia pliocaenica* Ristori, 1891, from the Pliocene of Spicchio (Empoli). *Ilia* Leach, 1817, is widespread in the Mediterranean Sea with the living species *I. nucleus* Linnaeus, 1758.

Superfamily Majoidea Samouelle, 1819
Family Majidae Samouelle, 1819
Genus *Maja* Lamarck, 1801

Type-species: *Cancer squinado* Herbst, 1788

Maja squinado (Herbst, 1788)
Fig. 7

1788 *Cancer squinado* – Herbst, p. 214, Pl. 14 (Figs. 84-85)
1817 *Maja squinado* – Leach, p. 1817, Pl. 18 (Figs. 1-6)
1857 *Maja squinado* – Meneghini, p. 557
1863 *Maja squinado* – Heller, p. 49, Pl. 1 (Figs. 17-24)
1914 *Maja squinado* – Gemmellaro, p. 81, Pl. 1 (Figs. 11-12)
1918 *Maja squinado* – Pesta, p. 361, Text-Fig. 116
1931 *Maja squinado* – Nobre, p. 142, Text-Fig. 82

- 1940 *Maja squinado* – Bouvier, p. 321, Text-Fig. 95
 1946 *Maja squinado* – Zariquiey Alvarez, p. 169, Text-Fig. 171
 1951 *Maja squinado* – Capart, p. 98, Text-Fig. 32
 1956 *Maja squinado* – Monod, p. 474, Text-Figs. 638-643
 1968 *Maja squinado* – Zariquiey Alvarez, p. 446, Text-Figs. 149a, 150g, h
 1980 *Maja squinado* – Ingle, p. 23, 45, 141
 1981 *Maja squinado* – Varola, p. 13, Pl. 3 (Fig. 1)
 1992 *Maja squinado* – Falciai & Minervini, p. 247, Pl. 17 (Fig. 2)

Occurrence and measurements: we ascribe to this species one well-preserved specimen in dorsal view. MG 0603 (Arda River). Carapace length: 100 mm.

Discussion. Even though the studied carapace lacks the anterior region, it shows the morphological characters of the living species *Maja squinado* (Herbst, 1788), widespread in the Mediterranean Sea.

Maja squinado (Herbst, 1788) is reported from the Pliocene of Monte Mario (Roma), Rocca Vecchia (Penisola Salentina) and Capo S. Marco (Oristano, Sardegna) (Meneghini, 1857; Ristori, 1891b; Varola, 1981) and from the Pleistocene of Monte Pellegrino (Palermo) (Gemmellaro, 1914).

Superfamily Parthenopoidea MacLeay, 1838

Family Parthenopidae MacLeay, 1838

Genus *Parthenope* Weber, 1795

Type-species: *Cancer longimanus* Linnaeus, 1758

Parthenope sp.
 Figs. 3 (1, 2, 3), 4 (6)

- 1891 *Lambrus?* sp. – Ristori, p. 21, Pl. 1 (Figs. 26-28)

Occurrence and measurements: we ascribe to this genus one fragmentary chela and three small-sized carpus and fixed fingers (2-4 mm). MG 0631 (Stirone River), MG 0640, MG 0641, MG 0642 (Arda River).

Discussion. The examined fixed fingers show strong spines arrayed in longitudinal rows. The shape of these fixed fingers is typical of the representatives of the family Parthenopidae and especially of *Parthenope* Weber, 1795. These kinds of fixed fingers were also described by Ristori (1891b) from the Pliocene marls from Monte Mario (Roma). The specimens described by Ristori were also small-sized with strong spines arrayed in longitudinal rows.

The studied specimens could be ascribed to juvenile individuals of *P. angulifrons* Latreille, 1825, widespread in the Mediterranean Sea and known in the fossil record from the Sicilian (upper Pleistocene) of Favignana Island (Trapani) (Garassino & De Angeli, 2004).

Superfamily Cancroidea Latreille, 1802
 Family Cancridae Latreille, 1802
 Genus *Lobocarcinus* Reuss, 1857

Type-species: *Cancer paulinowurtembergensis* Meyer, 1847

Lobocarcinus sismondae (Meyer, 1843)
 Figs. 9, 10, 11

- 1822 *Cancer punctulatus* – Desmarest, p. 92, Pl. 7 (Figs. 3-4)
 1839 *Cancer punctulatus* – A. Sismonda, p. 93, Figs. A, B
 1843 *Cancer Sismondae* – Meyer, p. 590
 1846 *Platycarcinus antiquus* – E. Sismonda, p. 58, Pl. 3 (Figs. 1-2)
 1857 *Platycarcinus antiquus* – Meneghini, p. 528, Pl. H (Fig. 11)
 1857 *Lobocarcinus Sismondai* – Reuss, p. 41, Pl. 9 (Figs. 1-2)
 1857 *Lobocarcinus imperator* – Reuss, p. 41, Pls. 7, 8, Pl. 9 (Fig. 1)
 1861 *Platycarcinus Sismondae* – E. Sismonda, p. 18
 1861 *Platycarcinus Deshayesii* – A. Milne Edwards, p. 88
 1864 *Cancer Sismondae* – A. Milne Edwards, p. 316, Pls. 24, 25
 1864 *Cancer Deshayesii* – A. Milne Edwards, p. 314, Pl. 22 (Figs. 1-2), Pl. 23 (Fig. 1)
 1875 *Platycarcinus Sismondai* – Bitter, p. 23
 1886 *Cancer Sismondae* – Ristori, p. 95, Pl. 2 (Fig. 1)
 1887 *Cancer Sismondae* – Mariani & Parona, p. 152
 1888 *Cancer Sismondae* – Ristori, p. 217
 1891 *Cancer Sismondae* – Ristori, p. 4
 1893 *Cancer* cfr. *illyricus* – Bittner, p. 32
 1895 *Cancer Sismondae* – Crema, p. 679, Text-Fig. 19
 1896 *Platycarcinus Sismondai* – Vinassa de Regny, p. 124, Pl. 2 (Fig. 1)
 1905 *Cancer Sismondae* – Lörenthey, p. 32
 1907 *Cancer Sismondae* – Lörenthey, p. 204, 208, 210
 1908? *Cancer Sismondae* – Couffon, p. 5, Pl. 2 (Figs. 3-4)
 1908? *Cancer Deshayesii* – Couffon, p. 5, Pl. 1 (Fig. 11)
 1910 *Cancer sismondae* – Fabiani, p. 33
 1921 *Cancer Deshayesii* – Bell, p. 7
 1924 *Cancer (Lobocarcinus) Sismondai* – Glaessner, p. 115
 1927 *Cancer Deshayesii* – Van Straelen, p. 87, Pl. 3 (Fig. 2), Pl. 4 (Figs. 1-2)
 1928 *Cancer Sismondai* – Glaessner, p. 176
 1929 *Cancer Sismondai* – Lörenthey, p. 161
 1934 *Cancer Deshayesii* – Van Straelen, p. 207
 1934 *Cancer sismondai* – Van Straelen, p. 207
 1946 *Cancer Sismondai* var. *antiatina* – Maxia, p. 134, Text-Fig. 1, Pl. 1 (Figs. 2-5)
 1950 *Cancer Sismondae* – Comaschi Caria, p. 150
 1950 *Platycarcinus antiquus* – Comaschi Caria, p. 283
 1956 *Cancer Sismondai* – Comaschi Caria, p. 283, 284, 288

- 1956 *Platycarcinus antiquus* – Comaschi Caria, p. 283
 1961 *Cancer sismondai* var. *antiatina* – Zappi, p. 86
 1965 *Cancer sismondai* – Varola, p. 295
 1965 *Cancer Sismondai* var. *antiatina* – Giannelli *et al.*, p. 521
 1969 *Cancer sismondai* var. *antiatina* – Largaiolli *et al.*, p. 29
 1969 *Cancer sismondai* var. *antiatina* – Rossi, p. 22
 1977 *Cancer* cfr. *sismondai* – Georgiades Dikeoulia, p. 420
 1981 *Cancer sismondai* – Varola, p. 16, Pl. 3 (Figs. 5-6), Pl. 4 (Figs. 1-2), Pl. 5 (Figs. 1-2), Pl. 6 (Figs. 2, 4)
 1982 *Cancer sismondai* – Via *et al.*, p. 242, Pls. 1, 2
 1982 *Cancer sismondai* – Bonfiglio & Donadeo, p. 270, Pls. 33, 34
 1982 *Cancer sismondai* – Bonfiglio, p. 1-7, Text-Figs. 1-4
 1984 *Cancer sismondai* – Müller, p. 75
 1988 *Cancer sismondai* – Solè & Via, p. 35
 1990 *Cancer sismondai* – Moissette & Müller, p. 739, Pl. 1 (Fig. 1), Pl. 2 (Figs. 1-2)
 1993 *Cancer sismondai* – Müller, p. 14
 1997 *Cancer sismondai* – Beschin & Santi, p. 13, Pl. 1 (Figs. 1-2)
 2000 *Cancer sismondai* – Garassino & Fornaciari, p. 29, Text-Fig. 1
 2000 *Lobocarcinus sismondai* – Schweitzer & Feldmann, p. 244
 2002 *Lobocarcinus sismondai* – Collins, p. 86
 2002 *Lobocarcinus sismondiae* – Bortoluzzi, p. 17, Text-Fig. 7

Occurrence and measurements: we ascribe to this species four well-preserved specimens in dorsal view: MG 0564, MG 0565 (Arda River), MG 0613 (Stirone River), MG 0619 (Cava Campore – Salsomaggiore Terme, Parma); four complete chelae: MG 0615, MG 0616, MG 0617, MG 0618 (Enza River). Carapace length comprised between 42 and 128 mm.

Discussion. *Lobocarcinus sismondiae* (Meyer, 1843), ascribed in the last centuries to *Cancer* Linnaeus, 1758, was frequently reported from the Miocene-Pleistocene levels of Europe (Great Britain, The Netherlands, Spain, Hungary, Italy, and Greece) and N Africa (Algeria). Schweitzer & Feldmann (2000) discussed the systematic position of *Cancer sismondiae* Meyer, 1843, assigning it to *Lobocarcinus* Reuss, 1857. The authors justified this assignation to the presence of distinctly lobed anterolateral margins, spined posterolateral margins and overall shape of the carapace and carapace regions. *Cancer illyricus* Bittner, 1883, and *C. deshayesii* A. Milne Edwards, 1861, are synonyms of *Lobocarcinus sismondiae* (Glassner, 1929; Müller, 1984; Collins & Fraaye, 1991; Schweitzer & Feldmann, 2000; Collins, 2002). *Lobocarcinus sismondiae* shows close morphological affinities with the living *Cancer bellianus* Johnson, 1861, widespread in East Atlantic Ocean.

The studied specimens show the typical morphological characters of *Lobocarcinus sismondiae* (Meyer, 1843), well described by Bonfiglio (1982) on numerous specimens discovered in Torre dell'Orso (Otranto, Salentina Peninsula).

Superfamily Portunoidea Rafinesque, 1815
 Family Portunidae Rafinesque, 1815
 Subfamily Carcininae MacLeay, 1838
 Genus *Carcinus* Leach, 1814

Type-species: *Cancer maenas* Linnaeus, 1758

Carcinus sp.
 Fig. 8

Occurrence and measurements: we ascribe to this genus four complete dactyli. MG 0643, MG 0644, MG 0645, MG 0646 (Cava Campore – Salsomaggiore Terme, Parma)

Discussion. Dactyli are strong, elongate and curved, and with short teeth on the occlusal margin. This kind of dactylus is present in *Carcinus* Leach, 1814, widespread in the Mediterranean Sea and Atlantic Ocean as two living species, *C. maenas* (Linnaeus, 1758) and *C. aestuarii* Nardo, 1847.

Superfamily Xanthoidea MacLeay, 1838
 Family Goneplacidae MacLeay, 1838
 Genus *Goneplax* Leach, 1814

Type-species: *Cancer rhomboides* Linnaeus, 1758

Goneplax rhomboides (Linnaeus, 1758)
 Figs. 12, 13, 14, 15

- 1758 *Cancer rhomboides* – Linnaeus, p. 626
- 1814 *Goneplax angulata* – Leach, p. 430
- 1822 *Goneplax impressa* – Desmarest, p. 102, Pl. 8 (Figs. 13-14)
- 1861 *Goneplax rhomboides* – A. Milne Edwards, p. 88
- 1863 *Goneplax angulata* – Heller, p. 103
- 1863 *Goneplax rhomboides* – Heller, p. 104, Pl. 3 (Figs. 3-4)
- 1891b *Goneplax bispinosa* – Ristori, p. 20
- 1914 *Goneplax* cfr. *rhomboides* – Gemmellaro, p. 90, Pl. 1 (Fig. 26)
- 1936 *Goneplax angulata* – Nobre, p. 57, Pl. 21 (Fig. 40)
- 1940 *Goneplax angulata* – Bouvier, p. 278, Text-Fig. 176, Pl. 9 (Fig. 2)
- 1946 *Goneplax angulata* – Zariquiey Alvarez, p. 162, Pl. 18 (Figs. a-b)
- 1958 *Goneplax rhomboides* – Holthuis & Gottlieb, p. 99
- 1959 *Goneplax rhomboides* – Zariquiey Alvarez, p. 5
- 1961 *Goneplax rhomboides* – Holthuis, p. 57
- 1968 *Goneplax rhomboides* – Zariquiey Alvarez, p. 414, Text-Fig. 138 a, b
- 1992 *Goneplax rhomboides* – Falciai & Minervini, p. 238, Pl. 17 (Fig. 1)

Occurrence and measurements: we ascribe to this species ten well-preserved specimens in dorsal view: MG 0566, MG 0596, MG 0597, MG 0598, MG 0599,

MG 0600, MG 0602 (Arda River), MG 0612, MG 0621 (Stirone River), MG 0614 (Enza River); three chelae: MG 0601, MG 0633 (Arda River), MG 0632 (Stirone River). Carapace length comprised between 9 and 18 mm.

Discussion. The main morphological characters of this species are: subrectangular carapace, convex longitudinally, with maximum width anteriorly; straight front, extended beyond the orbits; well-developed orbits; sinuous and elongate supraorbital margin; well-developed extraorbital spine; very elongate eyes; lateral margins slightly concave to the small antero-lateral spine and convergent until the posterior margin; wide posterior margin slightly concave in the medium part; dorsal regions not marked; smooth dorsal surface; branchiocardiac grooves not marked; branchial regions with a weak transverse depression; very elongate chelipeds in the male individuals; propodus of the cheliped well developed anteriorly; elongate and dentate fixed finger and dactylus; elongate ambulatory legs; pereopods I-V with merus having small spines along the upper margin.

The morphological characters of the studied specimens are those of the living species *Goneplax rhomboides* (Linnaeus, 1758), widespread in the E Atlantic, N Africa and Mediterranean Sea.

The carapace of *G. rhomboides* is extremely variable and it was interpreted by some authors incorrectly. Desmarest (1822) described and illustrated *G. impressa* based upon some specimens from the Pliocene of Monte Mario (Roma); Ristori (1891b) reported an almost complete carapace from the Pliocene of Monte Mario, ascribing it to *G. bispinosa* Leach, 1816 (*G. bispinosa* is synonym of *G. rhomboides*); A. Milne Edwards (1861) reported the presence of *G. rhomboides* from the Pleistocene of Palermo; Gemmellaro (1914) confirmed the report of Milne Edwards and ascribed to *G. cfr. rhomboides* a right dactylus from the Pleistocene marls of Ficcarazzi (Palermo).

As reported by Müller (1993), the two species *G. formosa* Ristori, 1886, and *G. meneghinii* Ristori, 1886, from the Pliocene marls of Rapolano (Siena) could be probably ascribed to *G. rhomboides*.

Moreover, Müller (1993) pointed out that *Goneplax sacchi* Crema, 1895, from the Piacentian of Monte Capriolo near Bra (Torino) and *G. cfr. sacchi* described by Lörenthey (1907, 1909) from the Miocene of Sardinia are synonyms of *G. gulderi* Bachmayer, 1953. Finally, Beschin *et al.* (1996) pointed out that *Goneplax craverii* Crema, 1895, from the Pliocene (Piacentian) of Bra was included in *Retropluma* Gill, 1894.

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Fig. 2 - *Nephropsis* sp., n. cat. MG 0620 (natural size).

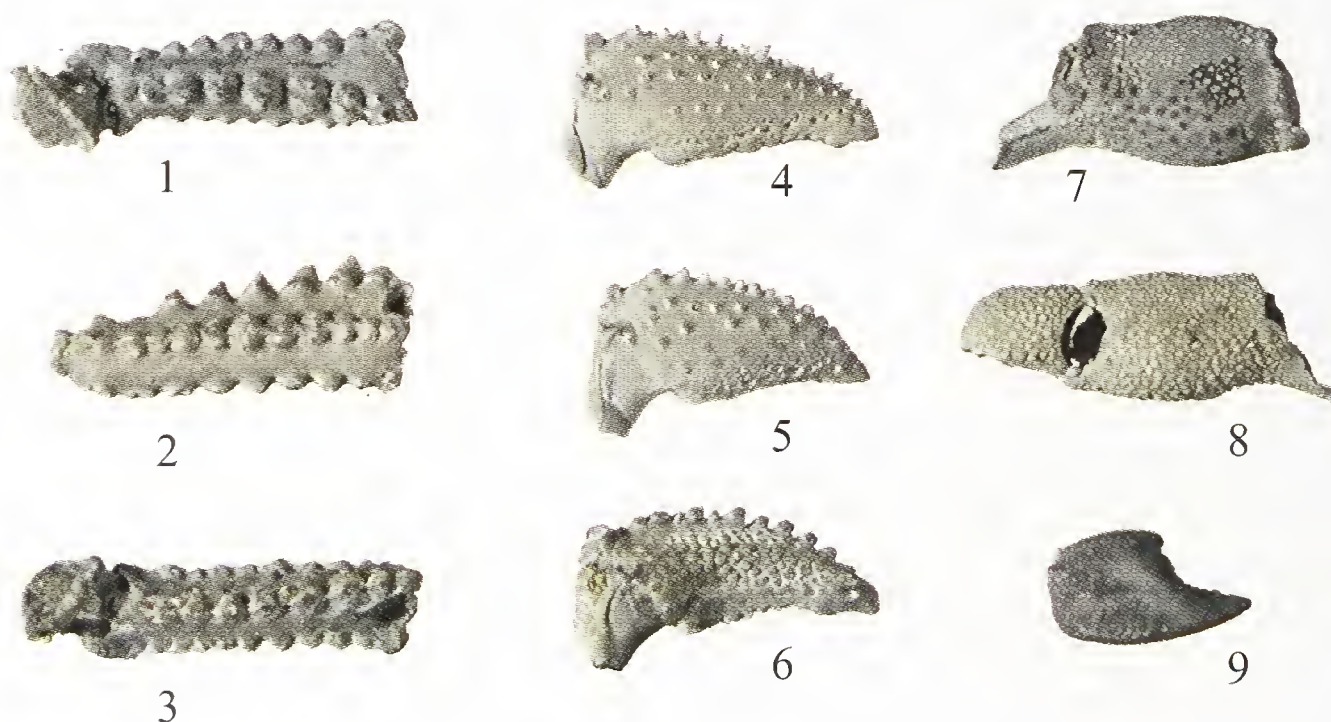


Fig. 3 - 1) *Parthenope* sp., n. cat. MG 0640 (x 5); 2) *Parthenope* sp., n. cat. MG 0641 (x 5); 3) *Parthenope* sp., n. cat. MG 0642 (x 5); 4) *Pagurus* sp., n. cat. MG 0633 (x 6); 5) *Pagurus* sp., n. cat. MG 0632 (x 6); 6) *Pagurus* sp., n. cat. MG 0634 (x 6); 7) *Ebalia cranchii* Leach, 1817, n. cat. MG 0608 (x 5); 8) *Ebalia cranchii* Leach, 1817, n. cat. MG 0628 (x 5); 9) *Anapagurus* sp., n. cat. MG 0635 (x 5).

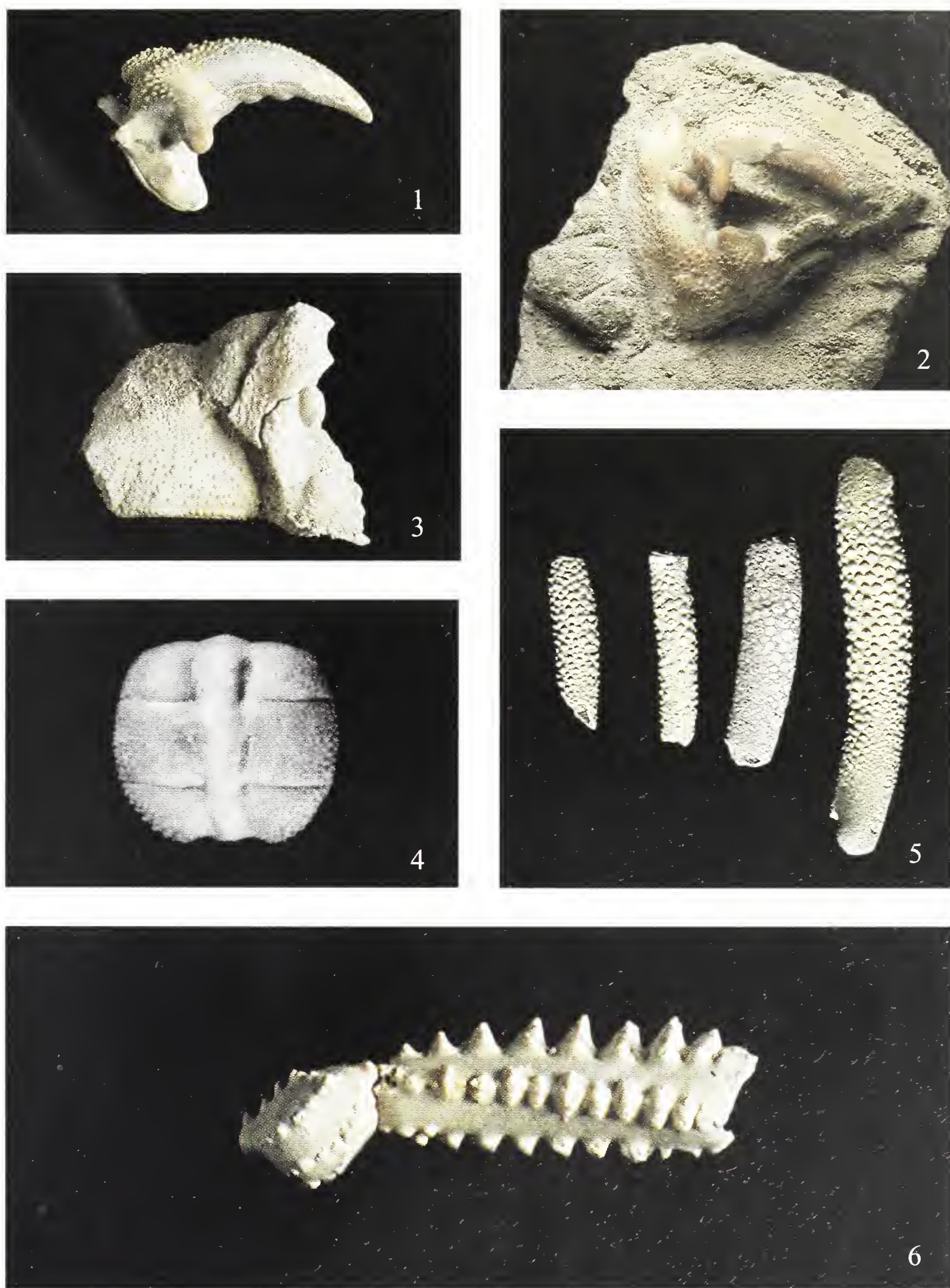


Fig. 4 - 1) *Calappa granulata* (Linnaeus, 1758), n. cat. MG 0609 (x 2); 2) *Calappa granulata* (Linnaeus, 1758), n. cat. MG 0610 (x 2); 3) *Calappa granulata* (Linnaeus, 1758) n. cat. MG 0611 (x 1,7); 4) *Ebalia cranchii* Leach, 1817, n. cat. MG 0648 (x 5); 5) *Ilia pliocaenica* Ristori, 1891, n. cat. MG 0636, MG 0637, MG 0638, MG 0639 (from left to right) (x 2,5); 6) *Parthenope* sp., n. cat. MG 0631 (x 11).

Fig. 4 - *Calappa granulata* (Linnaeus, 1758), n. cat. MG 0609 (x 2); 2) *Calappa granulata* (Linnaeus, 1758), n. cat. MG 0610 (x 2); 3) *Calappa granulata* (Linnaeus, 1758) n. cat. MG 0611 (x 1,7); 4) *Ebalia cranchii* Leach, 1817, n. cat. MG 0648 (x 5); 5) *Ilia pliocaenica* Ristori, 1891, n. cat. MG 0636, MG 0637, MG 0638, MG 0639 (da sinistra a destra) (x 2,5); 6) *Parthenope* sp., n. cat. MG 0631 (x 11).

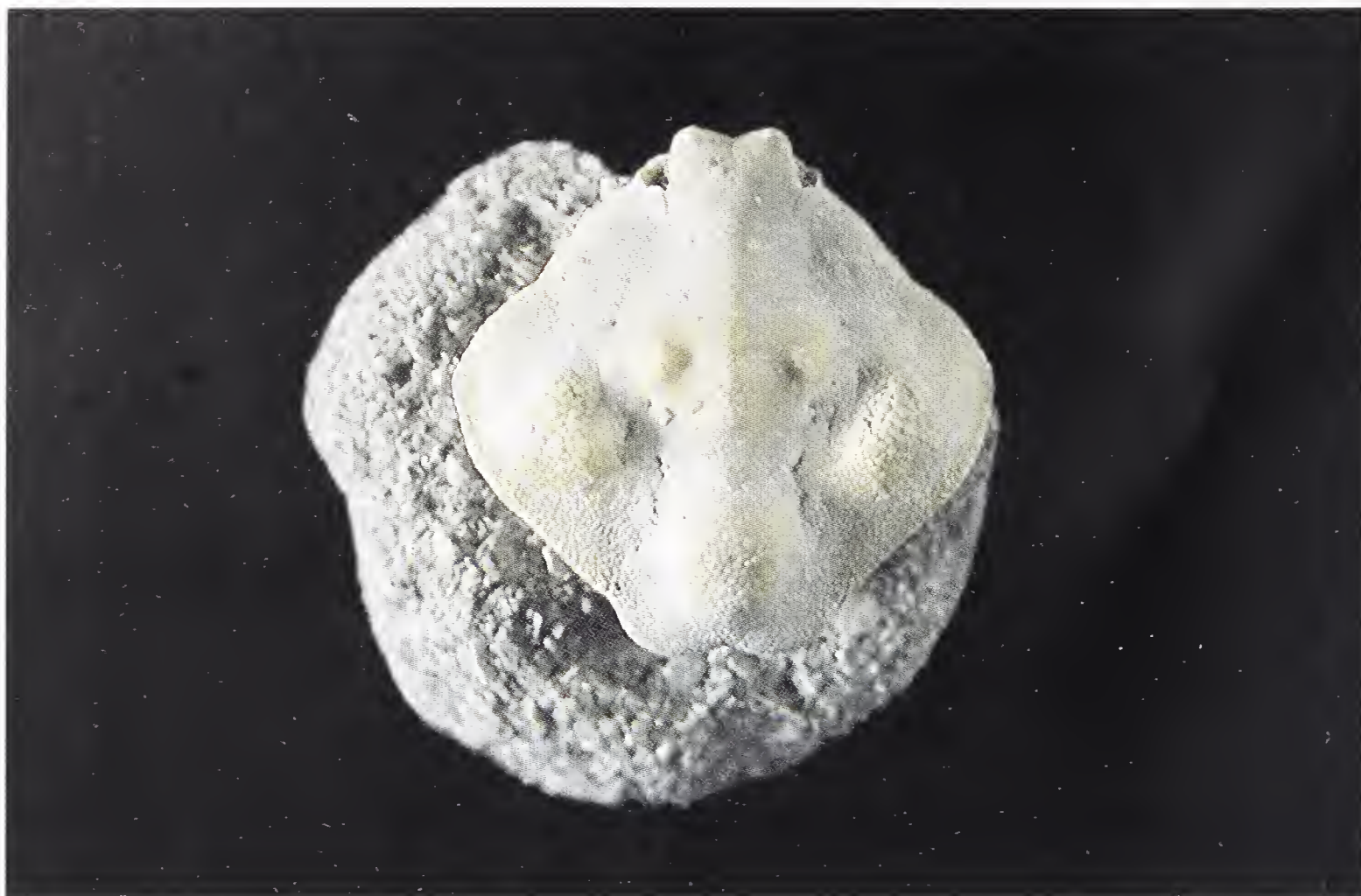


Fig. 5 - *Ebalia cranchii* Leach, 1817, n. cat. MG 0604 (x 6).

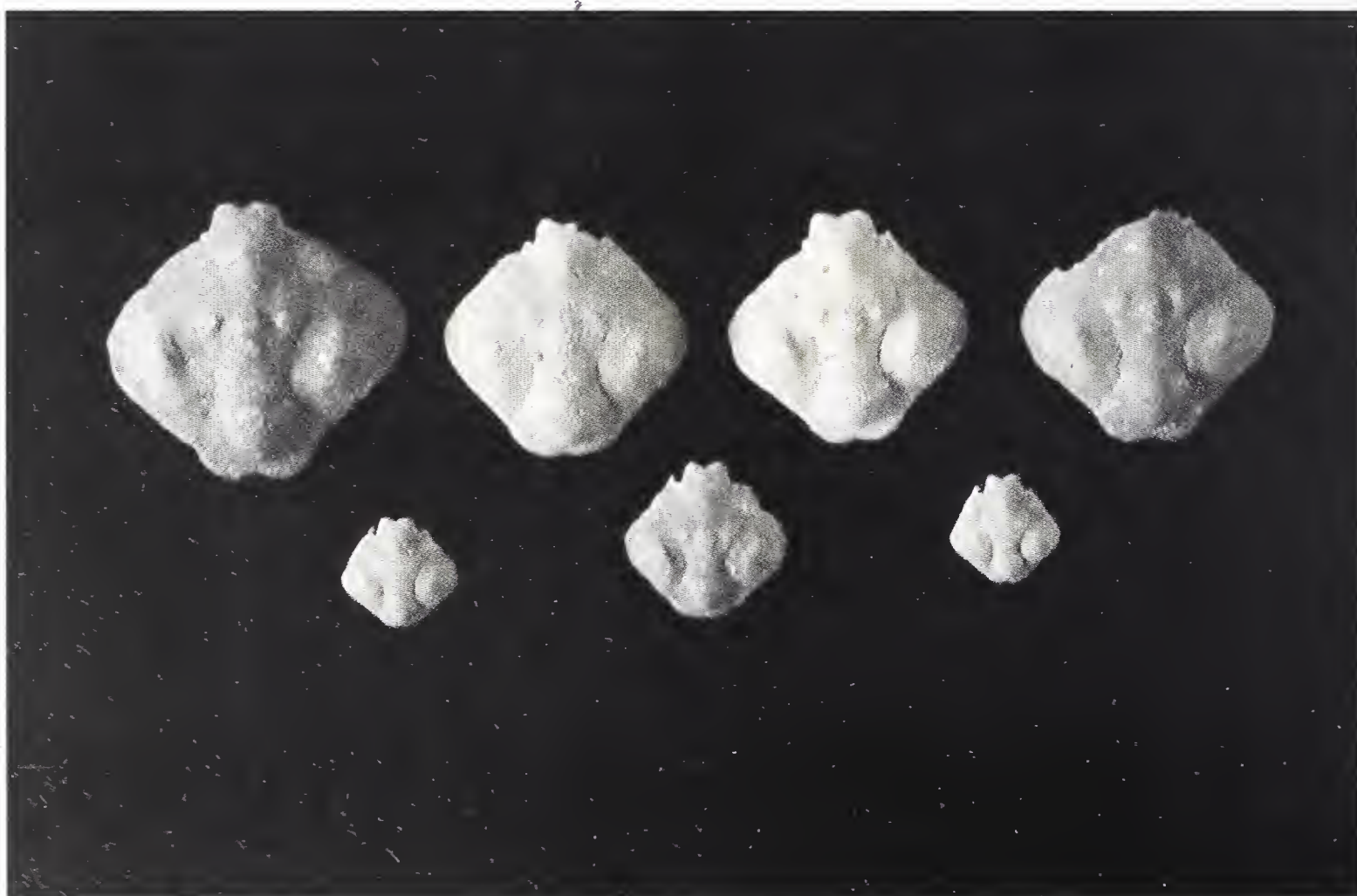


Fig. 6 - *Ebalia cranchii* Leach, 1817, n. cat. MG 0606, MG 0622, MG 0623, MG 0624, MG 0625, MG 0626, MG 0627 (from left to right) (x 3).

Fig. 6 - *Ebalia cranchii* Leach, 1817, n. cat. MG 0606, MG 0622, MG 0623, MG 0624, MG 0625, MG 0626, MG 0627 (da sinistra a destra) (x 3).



Fig. 7 - *Maja squinado* (Herbst, 1788), n. cat. MG 0603 (x 0.7).



Fig. 8 - *Carcinus* sp., n. cat. MG 0643, MG 0644, MG 0645, MG 0646 (from left to right) (x 2).
Fig. 8 - *Carcinus* sp., n. cat. MG 0643, MG 0644, MG 0645, MG 0646 (da sinistra a destra) (x 2).



Fig. 9 - *Lobocarcinus sismondae* (Meyer, 1843), n. cat. MG MG 0613 (natural size).



Fig. 10 - *Lobocarcinus sismondae* (Meyer, 1843), n. cat. MG 0565 (x 0.5).



Fig. 11 - *Lobocarcinus sismondae* (Meyer, 1843), n. cat. MG 0564 (x 0.3). a) dorsal view; b) ventral view.
Fig. 11 - *Lobocarcinus sismondae* (Meyer, 1843), n. cat. MG 0564 (x 0,3). a) norma dorsale; b) norma ventrale.



Fig. 12 – *Goneplax rhomboides* (Linnaeus, 1758), n. cat. MG 0600 (x 2).



Fig. 13 – *Goneplax rhomboides* (Linnaeus, 1758), n. cat. MG 0612 (x 2).



Fig. 14 – *Goneplax rhomboides* (Linnaeus, 1758), n. cat. MG 0566 (x 2).



Fig. 15 – *Goneplax rhomboides* (Linnaeus, 1758), n. cat. MG 0566 (x 2).